

WHAT IS CLAIMED IS:

1. An apparatus for forming a dual radius arch frame comprising:
  - a longitudinal member having a centerline and centerpoint;
  - a laterally adjustable support having one end attached to the centerpoint of said longitudinal member in a perpendicular orientation and a vertical support attached to a distal end of said laterally adjustable support;
  - a left outer form having a generally semi-circular shaped arch centered and oriented about a left pivot axis located on the centerline a predetermined distance from the centerpoint;
  - a right outer form having a generally semi-circular shaped arch centered and oriented about a right pivot axis located on the centerline a predetermined distance from the centerpoint;
  - an arched shaped center cord adapted to be connected to a receiving edge of said left outer form and of said right outer form in a tangentially continuous manner;
  - at least one adjustable left strut assembly interconnecting said left outer form to said vertical support; and
  - at least one adjustable right strut assembly interconnecting said right outer form to said vertical support.
2. The apparatus according to Claim 1, further comprising a set of preformed arched shaped center cords each having a different shape, wherein each center cord may be separately installed into said apparatus to vary the size of the dual radius arch frame to be formed.
3. The apparatus according to Claim 2, wherein at least one of a radius measurement  $R_3$  and arc length measurement  $l$  of each cord may be varied.
4. The apparatus according to Claim 1, further comprising a matching set of preformed left and right outer forms, each matching set having a different radius  $R_4$ , wherein each matching set may be installed into said apparatus to vary the size of the dual radius arch frame to be formed.
5. The apparatus according to Claim 1, wherein the dual radius arch frame is defined by a width  $W$ , arch height  $H$ , span length  $L$  and thickness  $T$ .

6. The apparatus according to Claim 1, wherein the dual radius arch frame is defined by a left and right outer form radius  $R_4$  and wherein said center cord has a radius  $R_3$  and arc length measurement  $l$ .

7. The apparatus according to Claim 6 wherein the left and right pivot axis are equally spaced a distance  $1/2L - R_4$  from the centerpoint of said longitudinal member.

8. The apparatus according to Claim 1, further comprising a center strut assembly interconnecting said left outer form and said right outer form.

9. The apparatus according to Claim 1, in combination with a plurality of laminate sheets conformally wrapped around said left outer form, said center cord, and said right outer form.

10. The apparatus according to Claim 9, further comprising a plurality of winch assemblies attached to said vertical support, said winch assemblies connected to a plurality of respective individual straps wrapped around said plurality of laminate sheets, said plurality of winch assemblies adjusted to tightly hold said plurality of respective individual straps around said plurality of laminate sheets.

11. An apparatus for forming and manufacturing a dual radius arch frame comprising:  
a horizontally oriented longitudinal member having an upper surface, a left side region, a center, and right side region, and plurality of aligned mounting bores laterally spaced apart in even increments traversing said longitudinal member;

a laterally adjustable support assembly having one end attached to the center of said longitudinal member in a perpendicular orientation and a distal end, and further including a vertical support attached to the distal end, said vertical support having at least one left strut swivel attach point and at least one right strut swivel attach point;

a left outer form having a generally semi-circular shaped arch centered and oriented about a left pivot axis positioned within one of said plurality of mounting bores located on the left side region of said longitudinal member, said left outer form having a left cord receiving edge and at least one left outer form swivel attach point;

a right outer form having a generally semi-circular shaped arch centered and oriented about a right pivot axis positioned within one of said plurality of mounting bores located on the right side region of said longitudinal member, said right outer form having a right cord receiving edge and at least one right outer form swivel attach point;

an arched shaped center cord section having a left attaching edge and a right attaching edge, said left attaching edge adapted to be connected to said left cord receiving edge of said left outer form and said right attaching edge adapted to be connected to said right cord receiving edge of said right outer form;

at least one adjustable left strut assembly having a left outer form attaching end and a left vertical support attaching end, said left outer form attaching end swivel attached to said one of said at least one left swivel attach point, and said left vertical support attaching end swivel attached to at least one left strut swivel attach point; and

at least one adjustable right strut assembly having a right outer form attaching end and a right vertical support attaching end, said right outer form attaching end swivel attached to said one of said at least one right swivel attach point, and said right vertical support attaching end swivel attached to at least one right strut swivel attach point.

12. The apparatus according to Claim 11, said arched shaped center cord comprised of a laminate material.

13. The apparatus according to Claim 11, further comprising a set of preformed arched shaped center cords, each center cord having a different shape, wherein each center cord of said set may be separately installed into said apparatus to vary the size of the dual radius arch frame to be formed and manufactured.

14. The apparatus according to Claim 12, wherein at least one of a radius measurement and radial arc length measurement of each cord may be varied.

15. The apparatus according to Claim 11, further comprising a matching set of preformed left and right outer forms, each matching set of preformed left and right outer forms having a different radius, wherein each matching set of preformed left and right outer forms may be installed into said apparatus to vary the size of the dual radius arch frame to be manufactured.

16. The apparatus according to Claim 11, wherein the dual radius arch frame is defined a width  $W$ , arch height  $H$ , span length  $L$  and thickness  $T$ .

17. The apparatus according to Claim 11, wherein the dual radius arch frame is defined by a left and right outer form radius defined by  $R_4$  and wherein said center cord has a radius defined by  $R_3$  and arc length measurement  $l$ .

18. The apparatus according to Claim 17 wherein the left and right pivot axis are equally spaced a distance  $1/2L - R_4$  from the centerpoint of said longitudinal member.

19. The apparatus according to Claim 11, said at least one adjustable left and right strut assembly each comprising a strut member adapted to internally receive a threaded strut member and a collar having receiving threads for adjusting the length of said strut assembly.

20. The apparatus according to Claim 11, further comprising a center strut assembly interconnecting said left outer form and said right outer form.

21. The apparatus according to Claim 11, in combination with a plurality of laminate sheets conformally wrapped around said left outer form, said center cord, and said right outer form.

22. The apparatus according to Claim 11, further comprising a plurality of winch assemblies attached to said vertical support, said winch assemblies connected to a plurality of respective individual straps wrapped around said plurality of laminate sheets, said plurality of winches adjusted to tightly hold said plurality of respective individual straps around said plurality of laminate sheets.

23. A method for forming a dual radius arch frame mounting structure utilizing a forming apparatus, comprising:

establishing a width  $W$ , arch height  $H$ , span length  $L$  and thickness  $T$  of a dual radius arch frame to be formed;

defining the dual radius arch frame by selecting a left and right outer form radius  $R_4$  and positioning a left and right outer form having a radius  $R_4$  at a left and right pivot axis equally spaced a distance  $1/2L - R_4$  from a centerpoint of a longitudinal member;

further defining the dual radius arch frame by a radius defined by  $R_3$  and arc length measurement  $l$  and positioning a center arch span having a radius  $R_3$  and arc length measurement  $l$  in the forming apparatus such that the center arch span tangentially interconnects the left and right forms forming a complete dual radius arch form;

applying a plurality of laminates with adhesive therebetween to the complete dual radius arch form to form a precut dual radius arch window frame;

surrounding the complete dual arch radius form and precut dual radius arch frame with a plurality of tensioned straps;

allowing the adhesive to set-up;

removing the plurality of tensioned straps from the forming apparatus; and

cutting the dual radius arch frame along an arch baseline to a desired dimension.

24. The method according to Claim 23 further comprising, utilizing at least one adjustable left strut assembly and right strut assembly to interconnect the left and right outer forms, respectively, to a vertical member laterally offset from the centerpoint of the longitudinal member and geometrically positioned underneath the center arch span, to provide additionally bracing to prevent the deformation or buckling of the complete dual arch radius form when the straps are applied to the dual radius arch frame.

25. The method according to Claim 23, further comprising utilizing a center strut assembly to interconnect the left outer form and right outer form to prevent the deformation or buckling of the complete dual arch radius form when the straps are applied to the dual radius arch frame.